Engineering change? The idea of 'the scheme' in African irrigation

Article (Accepted Version)

Engineering change? the idea of ‘the scheme’ in African irrigation

Abstract

Despite a growing recognition of the significance of farmer-led irrigation, externally engineered and induced schemes remain a popular model for irrigation development in sub-Saharan Africa. These have had a mixed record, and many have been widely critiqued. Nonetheless, schemes that were initiated under colonialism have been rehabilitated and new schemes are still being developed. This paper interrogates the continuing attraction of this model for irrigation, asking how and why it persists. Is the fact that engineering is so central to irrigation schemes another example of ‘high modernism’, as Scott might argue? Analysis of the history and current policy-making context of a new irrigation scheme in Malawi suggests a picture that is more complex, in which practical engineering considerations combine with narratives of modernisation and political imperatives to create momentum and lock-in. Understanding this, and why lessons from the past inadequately shape future-directed planning requires interrogation of the positionality of those involved, including state, donors and private sector actors and the political, economic and discursive fields in which they operate.

Keywords:

Irrigation, schemes, development, Africa, Malawi

Introduction

In sub-Saharan Africa, farmer-led irrigation has been identified as an important and widespread practice (Woodhouse et al. 2016). Farmers have long been diverting rivers, growing crops in low-lying wetlands, abstracting groundwater, and irrigating from mountain streams. Despite this, a strong narrative maintains that because sub-Saharan African irrigation is much less widespread than its

potential, especially when compared to Asia, there is a need for irrigation schemes that are initiated and supported by donors and governments (Oates et al. 2015). Both the World Bank and the FAO have stressed the need to tap underutilised potential through irrigation schemes, and the World Bank doubled its lending for irrigation between the periods 2000-2005 and 2006-2010, following a period when schemes had fallen out of favour (You et al. 2011). As Crow-Miller et al. (2017) have noted, there has been a resurgence of support for major infrastructure projects more generally among donors, including for irrigation (see also Blomkvist and Nilsson 2017). These developments are part of what has been characterised as the 'New Green Revolution' for sub-Saharan Africa (Patel 2013).

Newly formulated national irrigation development strategies include the development of new irrigation schemes and the rehabilitation of old ones. Recent initiatives in Kenya are one illustration of this. Here, the government has recently announced major investments in the revitalisation of previously defunct schemes. The Hola scheme is about to be rehabilitated with World Bank investment. The Bura irrigation scheme, also in Kenya, which was first launched in 1977, and seen by some as a vast waste of money[1] is also due for rehabilitation, this time with investment from the government of India. In Tanzania, the 2010 National Irrigation Policy suggests that there is considerable underutilised land that can be irrigated through improved schemes supported by donors. The Tanzanian National Irrigation Commission is charged with making this happen through the development of thousands of schemes. In Malawi, old schemes are being rehabilitated as part of the Green Belt Initiative, and the World Bank has recently approved the long awaited 42, 000 hectare Shire Valley Transformation Project (hereafter SVTP) – formerly the Shire Valley Irrigation Project

[1] The data on this is contentious, but a recent estimate has put the cost of the scheme since inception at close to half a billion US$ and described it as a 'case study of wastage of public resources' (Kamau 2016)

(SVIP), in line with the government prioritisation of irrigation in its Malawi Growth and Development Strategy (MGDS).

This paper is about this narrative of irrigation development through schemes and the interventions that accompany it. In particular, I ask how and why this model persists, despite extensive critique. I am specifically concerned with those schemes that are externally initiated and supported by both international donors and national governments. These are what have been called 'irrigation factories' – 'state engineered attempts to modernise African agriculture' (Veldwisch et al. 2009: 198; see also Bolding 2004, Diemer 1990) and have often involved elements of resettlement of farmers. In their classic overview of '*Irrigation Development in Africa'* Moris and Thom (1990) noted that irrigation schemes are 'designed from outside, externally financed (in many instances), and usually employ salaried staff' (1990: 6). This is in line with Adams and Anderson's (1988) observation that 'induced' irrigation has been an important dimension of most schemes and that whether or not they have been induced by outsiders influenced how they then evolved[2].

Such schemes have been widely criticised, both in terms of their approach and their effects, which in turn contribute to failure (Bolding 2004, Chambers 1969, Moris and Thom 1990, Mwendera and Chilonda 2013, Veldwisch et.al 2009). According to critics, they have romanticised and misunderstood the nature of communities (Chiroro and Harrison 2016), simplified gender relations and wrongly assumed households to be coherent economic units (Dey 1981, 1982, Hanger and Moris

[2] The dichotomy between externally induced and 'traditional' irrigation obscures the fact that all irrigation schemes will include elements that are more or less induced. However, the important distinction here is between schemes that are primarily initiated by outsiders as opposed to those that are led by farmers, whether over a long period of time or more recently.

1973, Lecoutere 2011, Van Koppen and Hussein 2007, Webb 1991). They have classified as 'farmers' people with only variable commitments to farming (Chambers and Moris 1973, Moris and Thom 1990), relied on imported 'expertise' at the expense of local knowledge, and involved land appropriations and dispossession (Ferguson and Mulwafu 2007, Mdee et al. 2014). They have been mismanaged and collapsed (Bolding 2004; Mollinga and Bolding 2004). Yet, over a period of close to 100 years, with notable peaks and troughs and diverse efforts at reform, schemes have persisted as a model.

In response to the apparent failures of irrigation schemes, there have been numerous attempts at 'reform', often through changing the institutional arrangements for scheme management, alongside the rehabilitation of failed schemes (Mollinga and Bolding 2004). This is what Suhardiman and Giordano characterize as the cycle of 'build, neglect, and rebuild' (2014: 91). Changing institutional arrangements have included new approaches to the roles of state irrigation agencies, local level institutions and private sector companies. Such shifts have broadly followed shifts in development thinking more generally. Notable among these have been discourses that in different ways suggest a diminution of the role of the state. Thus, from the 1980s onwards, there has been an appreciation that farmers had been given insufficient say in the schemes of which they were an integral part, and this has resulted in a series of policy changes towards more participatory approaches. The development of policy principles such as Irrigation Management Transfer (IMT) (Garces-Restrepo 2007, Suhardiman and Mollinga 2012) Integrated Water Resources Management (IWRM) (Allan 2006), and Participatory Irrigation Development (PID), in which farmers' organisations such as water users' associations (WUAs) have played an increasingly prominent role (Ostrom 1992, Venot 2014) are all part of this process. For some commentators, such ideas reflect a genuine desire to ensure greater farmer control, based on principles of autonomy and empowerment (van Koppen et al. 2012, Muchara et al. 2014). For others, they are linked to a broader neoliberal questioning of the role of the

state, accompanied by a desire to minimize state expenditure. In this, the responsibility for success and failure becomes located with farmers themselves - for example through an insistence that they form WUAs (Venot 2014).

Alongside concerns with farmer control, narratives have also emphasised an enhanced role for the private sector and a movement away from models of failed 'public sector' led management. The concept of 'public-private partnerships' (PPPs) in development schemes is increasingly emphasised (Trier 2014). Recently, Lankford et al. (2016) have called for a 'global irrigation compact', in which '…farmers and community leaders, government agencies, NGOs, private-sector entities and development partners commit to mutually create new leadership, partnership, ownership and learning arrangements' (Lankford et al. 2016: 14)[3].

In this paper, rather than revisit in detail the reasons for apparent earlier failure, I aim to analyse why the model of the scheme has persisted and continues to do so. As an illustration of this, I focus on the new SVTP in Malawi as a case study of an irrigation scheme in the making. The SVTP raises questions that are relevant to the other schemes currently being developed or rehabilitated across SSA: to what extent does the past shape plans for the future? How do politics and power play a part in momentum? The SVTP is a particularly interesting case as plans have evolved over many decades and have been documented in several studies, both historical and contemporary. Drawing on both primary data collected through ethnographic fieldwork and analysis of the written justification for its

[3] Though not necessarily labelled as such, PPPs actually dating back at least to colonial times. For example, a British scheme in Nigeria in the 1950s involved a partnership between the Colonial Development Corporation and 'A company' (unnamed) which would provide the necessary capital of £450,000 (UK Colonial Office 1951).

development, alongside historical accounts of development in the Shire Valley itself, I ask what this case tells us about continuity and change, stressing that the intersecting perspectives and priorities of a range of institutional actors (donors, national agencies, private sector consultancies) is important.

In the next section, before turning to the SVTP itself, I suggest an approach that focuses on the intersection between narratives and politics as revealing of power relations. The concept of 'high modernism' (Scott 1998) has been important in analysis of development schemes more generally, yet criticised for providing a somewhat simplified account of how power functions. Building on this critique, I argue that it is important to consider, not only how the justifications for schemes are influenced by engineering imperatives, but also how institutional and professional priorities come together to shape their momentum and 'lock-in' to the notion of the irrigation scheme. I then consider how this plays out in the case of the SVTP.

The model of the irrigation scheme: explaining persistence

An extensive literature has interrogated how development orthodoxies persist and are sustained by narratives that reflect power[4]. Is the externally engineered irrigation scheme one of these orthodoxies and what are the narratives that sustain it? According to Roe, narratives strategically simplify, and yet persist through time, often despite evidence that might undermine them. Among these, 'high modernist' narratives have been a subject of particular criticism (Bahre and Lecocq 2007, Escobar 1995, Mitchell 2002) – a criticism that has, in turn, contributed to a celebration of indigenous knowledge and 'farmer first' approaches (Pacey and Thrupp 1989, Sillitoe 1998). Scott's (1998) '*Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed'*, has been

[4] There are numerous examples. See Cornwall and Eade (2010), Fairhead and Leach (1997), Roe (1994), Venkatesan and Yarrow (2012) among many others.

particularly influential and is widely cited as one of the most trenchant critiques of high modernism (Bolding 2004, Li 2005, Reuss 2008). In *Seeing Like a State*, one chapter of the book focuses on an early incarnation of the SVIP in colonial Nyasaland as an especially clear example of the failure of high modernism. I will return to this account in my exploration of the evolution of the Shire Valley project below.

Li (2005) has argued that, despite the overall persuasiveness of Scott's arguments, *Seeing Like a State* takes insufficient account of the specificities of the interplay of power and resistance of different actors. In particular, she draws attention to the significance of the many proponents of schemes beyond the state. These range from non-governmental organisations through to private sector companies, donor agencies, and individuals such as scientists and consultants. All are differently positioned – in terms of social standing, expertise, geographical location and so on. She suggests that understanding this positionality (and the ways in which it affects political stance), can 'bring a more complex field of meaning and action into view' (2005: 385). I agree with this argument: as I will show, the 'high modernist' narrative that Scott recounts for Malawi – that of a straightforward example of 'welfare colonialism' - was actually more fragmented than this, and this continues to be the case in the contemporary context.

One important element of positionality is the role of particular forms of expertise. Irrigation schemes are somewhat different to certain 'high modernist' schemes in that they are <u>both</u> grand plans to 'improve the human condition' but are also entities that involve the construction of infrastructure, such as headworks, canals, dams and so on and the rearrangement of the of physical dimensions of rural areas (Crow-Miller et.al 2017). This points to the significance of the imperatives that are shaped by engineering (and engineers) and the ways in which these are embedded in the political and the social. Irrigation schemes combine both particular sets of technological expertise with the politics

associated with their maintenance, as well as the fact that the physical changes of dams, canals and so on bring with them social changes, including alterations to property relations (Coward 1986). As Molle et al. (2009a: 328) have argued, large-scale water resources development 'has been a defining feature of the 20th Century'. This, they maintain, has been fueled by a combination of technological skill and innovation and a belief in the modernizing possibilities of such engineered change – a 'hydraulic mission' (see also Allan 2006, Mollinga 2009). Such a mission is evident globally and has been widely critiqued. For example, in Thailand the extensive plans for the dry northeastern region of the country *(Isaan)* have been criticized for combining an over-optimistic account of their potential benefits with a failure to understand the social and environmental costs (Molle and Floch 2008, Molle et al. 2009b). In Africa, two of the most widely cited examples date back to the early 20th Century; the Gezira irrigation scheme in the British Sudan and the Office du Niger in the French Sudan, each massive examples of engineered change whose evolution is described in detail by Ertsen (2006). As Ertsen argues, these schemes were based on modernizing narratives that assumed that the land on which they were constructed was basically empty, unused and without history.

Thus, the engineering characteristics of irrigation schemes may well constitute an important driver of their development in their own right, and this is shaped by the professional priorities of those involved (Liebrand and Udas 2017, Mollinga 2003, Wade and Chambers 1980). The professional staff of irrigation bureaucracies still tend to be engineers (Suhardiman and Giordano 2014), which may lead to a tendency to focus on the technical in isolation from the social. However, a dichotomy between engineers on the one hand, and social scientists on the other also obscures negotiation between differently positioned individuals and interest groups (see Koetsier 2014, Reuss 2008). It is likely therefore that there is more to the persistence of the scheme model than the simple dominance of engineering. Their champions will have important aspects of their personal and professional lives

invested in ensuring that schemes are carried through. Tracing and recording such motivations is not generally part of the discussion in the persistence of irrigation schemes[5].

As suggested above, and widely articulated elsewhere (e.g. Crewe and Harrison 1998, Mosse 2005, 2011) the evolution of development projects does not follow a neat linear progress, prescribed by the nominal formal stages of 'project cycles'. Like other forms of development projects, irrigation schemes are necessarily complex with a wide array of stakeholders. Nonetheless, as Chambers (1969) observed for the Mwea irrigation scheme in Kenya, they also tend to have a momentum, which he characterises as the 'irreversibility of commitment' (1969: 257). What shapes this irreversibility? For Mwea, it was caused by a combination of the personal drive of key individuals, the political wrangling between agriculturalists and engineers, and the momentum caused by these factors combined. Chambers argued that: 'There is no point at which precisely it can be said that a decision was taken to implement the Scheme. Rather there was a rapid flow of events towards involvement and commitment' (1969: 59).

Chambers' account of the development of the Mwea scheme is getting on for fifty years old, but the notion of the 'irreversibility of commitment' resonates with more recent accounts. As Moris and Thom (1990) found for projects in Nigeria and Kenya, there is a tendency for project implementation to speed up once donor funds become available. This was also identified in the case of the BVIS in Malawi (Veldwisch et al. 2009). Technologies are thus embedded in both private and public institutions which contributes to 'lock-in' – a process in which private sector corporations, government bodies, local politicians, engineering and planning companies and consultancies, all have stakes in funds and sustain their stakes through narratives of national need, resource crisis or technology gap (Leach et al. 2010, Unruh 2010, Stirling 2015). In the case of the SVTP, to which I

[5] Two notable exceptions are Koetsier (2014) and Liebrand (2010), both for Nepal.

turn next, this concept of 'lock-in' may explain how narratives of national and local need have intersected with engineering imperatives over time and reveal how momentum is sustained in the face of both competing priorities and dissent from the dominant narrative.

A scheme a long time in the making

On 18th October 2017, the World Bank approved the funding of the SVTP. The agreement is for a programme that will cost a total of $235 million, of which $160m is from the World Bank, with contributions from the Government of Malawi, African Development Bank and the Global Environmental Facility. The programme covers an area of more than 40,000 hectares and will last for 14 years. The overall objective is 'to increase agricultural productivity and commercialization for targeted households in the Shire Valley; and to improve the sustainable management and utilization of natural resources' (World Bank 2017a:1). Of its four components, the provision of irrigation via the Shire Valley Irrigation Project (SVIP) is by far the most significant, accounting for around 60% of the overall budget. The SVTP focuses on Chikwawa and Nsanje Districts, to the South of Lake Malawi. These are two of the poorest districts in the country, combining low agricultural productivity with natural disasters such as droughts and flooding. They also seen as having development potential both because of the pockets of wealth generated through sugar production and also because there are abundant water resources. The SVIP will involve the construction of a water intake at Kapichira Falls and three main canals with a total length of about 133km. Other activities focus on strengthening land tenure and encouraging the commercialization of smallholder farming activity.

According to the press release:

> 'The program will boost agricultural production, provide drinking water services, improve sustainable management of natural resources including wetlands and protected areas, while

> enhancing tourism potential. “The rewards for this program will indeed be transformational for Malawi’s agriculture and the national economy,” said Joseph Mwanamvekha, Malawi’s Minister of Agriculture, Irrigation, and Water Development. “The beauty of the whole program is that it will engage the smallholder farmers to modernize and commercialize agriculture. We ultimately anticipate a half billion-dollar benefit to the economy.’ (World Bank 2017b).

As I will outline next, this programme, especially its irrigation element, has been a very long time in the making, with origins that go back at least eighty years. In table 1, below, I summarise some of the key elements of its history as well as the sources from which I draw this.

Table 1 here.

My account arises from both secondary data and interaction with individuals involved in project development. Differing perspectives on how - and whether - the scheme should proceed are hinted at both in such documentation and informal interviews. The material on which this paper is based was gathered in the context of a research project that considered irrigation development in Malawi more generally and involved ethnographic fieldwork in Nsanje District, just south of the proposed SVIP (Chiroro 2015, Harrison and Chiroro 2016). The present account is based on observation and discussion at a conference on the prospects for the Shire Valley in November 2014, as well as 25 formal interviews with key actors at both senior and more junior levels, representing government, donors, the private sector and civil society at country and district level. These interviews were

undertaken between October 2014 and June 2016 and lasted for between one and two hours[6]. No World Bank staff in Washington DC were interviewed.

'Taming the unruly flows': colonial and post-colonial planning

The Shire River is the principal outlet to the south of Lake Malawi and the valley through which it flows has long been the subject of development aspiration. Back in the 1940s, this was partly seen as a matter of taming the 'unruly flows' (Welsh 2013, 2014) from Lake Malawi that resulted in sporadic flooding of large areas of farmland. But it was also about perceiving an opportunity to develop areas that were full of unrealised potential. In the 1940s, the Shire Valley Project was intended to be a centre-piece of British colonial planning for Nyasaland/Malawi. This is characterised by Scott in *Seeing Like a State* (1998: 226) as 'welfare colonialism', based on a complete faith in 'scientific agriculture' and a lack of faith in the agricultural capabilities of Africans. Drawing on Beinart's (1985) study of planning for the lower Shire Valley, Scott argues that that this was largely a matter of the need for control and rendering 'legible' previously scattered residence and tenure arrangements. This had important aesthetic elements of order and regularity. The plans included a hydro-electric project, barrage, and irrigation infrastructure. Scott argues that the plans for the Shire Valley 'failed almost completely', largely because of farmer resistance to its numerous strictures. Meanwhile, the static and standardized model of the cultivators that was adopted failed to understand the great variability in agricultural strategies among farmers.

Scott's reading of Beinart's study presents the Shire Valley Project as a clear case of 'high modernism' and scheme failure because of its misunderstanding of farmers. However, this is not

[6] These interviews and observations were carried out by both the author and Dr Canford Chiroro, the research officer for the project.

quite what Beinart argues, although misunderstanding of farmers is certainly an important part of the picture. Importantly, Beinart's account identifies a somewhat disparate series of projects and initiatives, from conservation policies to resettlement and land use plans, as well as the proposed Shire Valley Project itself – the latter involving plans for irrigation and considerable infrastructure. However, while the conservation agriculture, land use and resettlement almost certainly failed, the SVP itself was in fact never implemented. Plans for irrigating the Valley came to nothing because of a combination of a lack of money and the political context of the time.

Between 1940 and 1960, a range of different players had roles in devising the scheme. Thus, in the 1940s, at least three different colonial officers conducted studies into the possibility of using the waters of the Shire for irrigation, and came up with divergent diagnoses of the problems and possibilities. Then in 1947, 'the colonial government, thoroughly confused, plumped for a long term professional survey, even if the cost would be high' (Beinart 1985: 129). A British consultant engineering firm, Halcrow, was eventually commissioned to undertake this. Its report of 1954 suggested a project that would cost £78million, some 39 times more than had been suggested by one of the earlier studies. Supporters of this project suggested that it would revolutionise life of the Southern Province and importantly 'put a cork in the bottle before it is too late' (Beinart 1985: 133) – a reference to the supposed social and political strains of an area of increasing population and limited opportunity.

In the end, it was the cost of the proposed project that turned out to be a significant barrier. Much of the drive for it had come from the Nyasaland government and its various civil servants, but the Colonial Office was much less ambitious in its aspirations. Politics also played a role and hopes that

funding might come from the Federal government[7] also came to nothing, despite arguments made in support of this from Nyasaland. Eventually, the only element that was actually constructed was a temporary bund across the Shire river, which was breached in 1957, causing serious flooding. This event, combined with rising African opposition to agricultural schemes, led to even more caution in putting earlier plans into practice. Rather than a complete failure, the SVP of the 1940-1960s could thus be seen as a 'damp squib' (Beinart 1985: 139). Importantly, the fact that it did not get off the ground reflects, less the coherence of a state vision than the competing interests of a diverse set of groups and individuals, from consultancy firms, to universities, government technical officers, financial institutions – and the private sector.

One key element of the proposed SVP had been the possibility of combining smallholder production with a sugar plantation in partnership with a private company. A test site was developed at Nchalo and discussions held with the multinational company Booker McConnell. By the mid 1950s, this was seen as one potential means of offsetting the considerable capital outlay required for the project. However, Booker McConnell withdrew from the project when it became apparent that the Federation would not meet its demands for tariff protection and guaranteed prices for sugar. Subsequently, in 1963, the London based firm of Lonrho decided to develop a sugar estate in the Nchalo area. Nearly 12,000 acres of public land were then acquired from the newly independent Malawi government on a 99 years lease. One of the objects of this was said to be 'the economic stimulation of a rather backward and undeveloped part of the country, namely the lower Shire Valley' (Amer and Hutcheson 1965: 11). Importantly, it was calculated that the scheme would contribute around 4% to the national GDP through its production of sugar for export. The resulting sugar estate at Nchalo,

[7] The Federation of Rhodesia and Nyasaland existed between 1953 and 1963

now under the ownership of Illovo, Africa's largest sugar producer, has been at the centre of plans for the current SVIP.

During the 1960s to the 1980s, The World Bank supported three phases of a major integrated rural development project in the Shire Valley, commencing in 1968, 1973 and 1978. A 1988 review of its rural development interventions in Africa (Mundial 1988), noted that in Malawi, 'in technical terms there is a fairly large irrigation potential' (Mundial 1988: 85). However, after 15 years, the production impact of the various projects had been 'negligible'. Blame was placed on both a failure on the part of government departments to maintain facilities and infrastructure, and on training benefiting already-successful farmers, traditional leaders and politicians. The study concluded that 'It should be of concern to the Bank that past investments are deteriorating without proper maintenance and repair. This issue needs to be pursued forcefully and resolved, while, or preferably before, processing any new lending operations' (Mundial 1988: 86).

The 21st Century scheme

In the 21st Century, various studies have been commissioned to assess the feasibility of developing a major irrigation scheme in the Shire Valley. These included consultancy studies in 2008 and 2011, the latter focusing on public-private partnership (PPP) options based on a possible relationship with Illovo Sugar (BRL Ingénierie 2011), a 2013 project appraisal report (ADB/AWF 2013), and in 2016/7, a series of socio-economic and technical studies that culminated in the final project document, published on the World Bank website in September 2017 (World Bank 2017a). This has significant differences from earlier plans, on which I will comment below. Importantly, during 2016/7 the proposed Shire Valley *Irrigation Project* became the Shire Valley *Transformation Program*, suggesting a wider set of objectives than previously articulated.

The drivers of the current plans involve a complex combination of stakeholders within the government, especially within the Ministry of Agriculture, Irrigation and Water Development, as well as representatives of donor agencies, particularly the World Bank, but also the African Development Bank, FAO and IFAD. In addition, the private sector, most specifically in the form of Illovo Sugar, has for a long time been a key element of scheme design. Irrigation is a key element of Malawi's Growth and Development Strategy (MGDS) which has involved support to projects such as the Green Belt Initiative that sought to rehabilitate previously failed schemes[8]. As elsewhere in SSA, Malawi has a long and chequered history of state and donor supported irrigation schemes, many of which were built in the 1960s and 1970s and were beset by both technical and social failings (Chidanti Malunga 2009, Ferguson and Mulwafu 2007, Gwiyani-Nkhoma 2011, Veldwisch et.al 2009).

In all of its 21st century articulations, rationales for the scheme have focused on poverty alleviation and national need, combined with modernisation and improved productivity. For example, an online news site quoted the World Bank Acting Country Manager saying: "We trust that through this project, Malawi's agriculture will go beyond the food security agenda to commercial agricultural investments that will sustainably pull people out of poverty"[9]. The 2013 project information document (PID) (World Bank 2013) noted that there has long been an aspiration to develop irrigated agriculture in the Shire Valley, though without mentioning the series of interventions from the 1960s-1980s. It stressed that: 'The CAS [Malawi's Country Assistance Strategy] recognizes the transformative potential of the proposed project in turning a poor and disaster-prone area into a high

[8] The Green Belt initiative has been the subject of considerable critique. See for example Chinsinga 2016

[9] http://www.maravipost.com/agenda-transform-malawis-irrigated-agriculture-world-bank-approves-166-million/

productive growth pole with regional significance, and highlights the potential ability of the project to support commercialization and draw in much needed foreign investment' (World Bank 2013: 5).

The SVIP also became part of the general momentum, now enshrined in Malawian law, that supports the private sector in the development of irrigation, reflecting the trends discussed above. The dominant discourse is one of a celebration of the 'private' over the 'public', identified above, which is equated with the state, in line with ideas that emphasise choice, initiative and entrepreneurialism. Thus, while farmer participation continues to be portrayed as important, from the perspective of both the SVIP funders and the government, it was also intended to be an exemplar of the model of private partnership emphasised in the PPP bill of 2010. As the study that assessed public-private options put it: '…The development and management of these 23 200 hectares of irrigated fields clearly show that the greenbelt initiative and indeed the future of irrigation in Malawi is in the hands of the private sector' (BRL Ingénierie 2011: 10). In this model, the private partner is envisaged to work with smallholders, organised into associations: 'Smallholder farmers would organize themselves, through a highly participatory planning and development process, into consolidated blocks of irrigable land and commodity-based producer organizations in win-win partnerships with profitable value chains, including the provision of agricultural support services' (ADB 2013: vi).

The programme that was finally agreed in October 2017 is, as noted above, different in key respects from the plans of four years previously. Not only is it broader in its aspirations, being concerned with the 'transformation' of the whole of the Shire Valley in three 'pillars', of which the SVIP is an important first, but the proposed role of the private sector has also changed. There is continuity with earlier aspirations inasmuch as the programme 'addresses the risk of monolithic state-driven development without room for private initiative that has been the hallmark of previous large-scale irrigation developments on the continent' (World Bank 2017a: 28). However, although there had been extensive investigation of the possibility of PPPs for the construction of the project, this was

eventually deemed to be not possible, largely due to a shortage of private investors. As a result, the Government of Malawi is to undertake the design and construction of the project through traditional public procurement.

In addition, as noted, for a long time the project had been based on a rationale that revolved around the production of sugar for increased national income, in partnership with Illovo. As the 2013 PID notes: 'The long term presence of Illovo with their knowledge, experience and interactions with the local farming community is seen as an opportunity for the project' (ADB 2013: 7). In the 2017 documentation, this rationale has shifted towards one of protection against the impacts of climate change, particularly drought and floods, and increased food security through improved productivity. Although sugar is mentioned as a possible crop to be cultivated, this is modified by the caveat that Illovo does not at present have the capacity to process additional sugar. Illovo is still part of the project plans but it is noted that 'Monoculture cropping would also present a risk, especially when it is linked to a single buyer. Therefore, the project promotes diversification and supports the trend by Illovo and outgrowers to shift to a partnership approach from a purely contractual approach' (World Bank 2017a: 29).

Managing dissent, presenting coherence and sustaining momentum

The rationales for the project in its planning documentation and in media reports are overwhelmingly positive and generally cohesive. However, this is not to say that there is not dissent from the dominant narrative, including both speculation about its implications for those who are affected by it, as well as less public grumblings reflecting institutional and professional interests and suspicion of the consultation processes. For example, there was a sense among some traditional leaders that they were not being heard. As one put it:

> Sometimes they bring one or two of us to these fancy hotels and feed us on fine food and drinks. Then they call is into their meetings in which they are the majority and we feel outnumbered and unable to engage with them, because the meetings are often in English. What meaningful argument can you make in such settings? If they want to engage with traditional leaders they need to come to the village and talk to us and our subjects (Traditional Authority spokesman, November 2014).

Key issues are the implications of the changing property relations caused by the new project. The project rationale includes the assumption that there is a need to formalise existing land tenure on the basis of the argument that the insecurity caused by customary tenure leads to poor productivity. In other irrigation contexts it has been established that altering and formalising property relations may work in the interests of those who are already more powerful (e.g. Cleaver 2012, Merrey et al. 2007). In the SVIP, a large proportion of the earmarked land is currently under customary tenure and administered by traditional authorities. However, the relationship between this fact and either productivity or insecurity is at the very least disputed. Some within the Department of Irrigation warned of potential problems: 'All that land along the Shire is land that is currently being utilised by small farmers' (Key informant interview, November 2014). Others downplay the possible negative impacts. A senior government minister said that 'No one will be asked to move. We may just have to change the arrangements a bit so that some people end up operating slightly larger fields' (Key informant interview, December 2014). More strongly, a senior Irrigation Department official said: 'This is a government programme that is looking at the bigger picture and aiming to benefit the whole country and not just a few farmers… so it's basically idle land that the government is repossessing and putting into productive use' (Irrigation Department official, May 2016).

The issues of land access and resettlement are dealt with in considerable detail in the background studies which support the final 2017 agreement. The Resettlement Policy Framework (RPF) and Environmental and Social Management Plan (ESMP) of August 2017 (GOM 2017a, GOM 2017b), bring the findings of these together. The RPF establishes the principles which will underlie any necessary resettlement, though not the details of this, as these will be determined subsequently in Resettlement Action Plans (RAPs). The RPF notes the difficulty in anticipating the detail of the RAPs, not least because during there have recently been significant changes to Malawi's land laws[10] and the full implications of these are not yet known. In addition, while the principles of the project have been agreed, the precise location of the irrigation canals, and hence who is likely to be affected, has not. The RPF sets out comprehensive procedures for allocating compensation to Project Affected Peoples (PAPs), alongside a Grievance Redress Mechanism (GRM) for those who believe themselves to have been harmed by project activities, designed in line with principles developed by the World Bank and FAO. The GRM acknowledges that there is considerable anxiety among those who may be affected by the project, including fears of loss of land to the government or private investors. It is designed to address these through a series of committees, starting at Group Village level, and scaling up to the Area, District and National levels.

The RPF is the result of extensive consultation, including around 250 focus groups and a (2015) survey of more than 1000 households. The background studies cover a wide range of issues, including economics and food security, gender, youth, agriculture, and land tenure. However, although land tenure is extensively discussed, and it is noted that both matrilineal and patrilineal inheritance systems exist within the scheme area, potential conflicts over land are not treated as

[10] These include the Land Act, 2016, Customary Land Act, 2016, Lands Acquisition (Amendment) Act 2016, Land Survey Act, 2016.

significant. This is despite the fact that evidence from elsewhere in Malawi, for example Ferguson and Mulwafu's (2007) study of two irrigation schemes, has found that local histories and practices are critical in shaping access to land and water. Importantly, the formalisation that has accompanied scheme development enabled local elites to capture resources. Ferguson and Mulwafu suggest that this problem is particularly acute in areas of matriliny (which is the case for large parts of the SVIP area) and that it can have negative effects on women's control over land (see also Peters 2010).

More generally, in the background studies and project documentation, existing research on the difficult history of irrigation schemes in Malawi is not cited. Rather, the possibility of conflict is addressed through the scheme's formal Grievance Redress Mechanism, (GRM) mentioned above. In its formalised approach the GRM is based on an assumption that conflicts can be resolved through public discussion. While of course this may often be the case, this assumption entails a limited account of the ways in which power operates, where conflict may be latent and the interests of the less powerful suppressed.

While there is little cause to doubt that considerable thought has gone into the land tenure dimensions of the project, such dimensions have also caused suspicion and concern and the legacy of this is likely to persist. Some informants speculated that the project would be a vehicle for the consolidation of the power of those who already had property and that only some voices were being listened to. The project appraisal document itself concedes that:

> While the benefits of such a transformation are potentially enormous, there are also significant associated risks that they could be diverted and captured by elites. Such risks could take a variety of typical forms. People better able to understand formal legal processes or with greater connections to political or economic capital may seek to manipulate the land

> adjudication process and successfully lay claim to more than their share. Less sophisticated participants may be induced by local elites or outside speculators into ill-informed informal sales in advance of the land consolidation process (World Bank 2017a: 102).

The SVTP has also developed in a context of competition between government departments which is not part of the picture of coherence that is presented in project documentation. In 2014, the Ministry of Agriculture and Food Security and the Ministry of Irrigation and Water Development merged to become the Ministry of Agriculture Irrigation and Water Development. Prior to this, their separation was seen as problematic, especially for those within the Ministry of Irrigation and Water Development, which was recognised as a lower status ministry[11]. For some informants, the merger was a positive step, as it would enable better coordination. As one donor employee explained:

> Donors are unlikely to have knowledge of what is happening at the level of the scheme – that coordination had to be managed by the Ministry of Irrigation, and it is a blessing in disguise now that the ministries of Agriculture and Irrigation have been combined. The tendency had been for different donors to report to different ministries and that led to confusion and competition (Employee of donor-funded project, December 2014).

But others saw ministerial competition persisting, even with the revised structures, especially as, initially at least, the two Permanent Secretaries retained their positions. A senior district official suggested that 'the recent merger of Irrigation and Agriculture will not change much; they are still separate, both structurally and spatially' (Key informant interview, Dec 2014). This was also seen as a matter of capacity: 'The weakest link in irrigation development has been the assumption that DOI will manage the coordination. The department does not have the capacity'. An employee of the

[11] The terminology of 'status' was used by several informants, several of whom even specified the relative status of different departments (agiculture is '1', whereas irrigation is '5')

irrigation department observed that this also reflected professional priorities and training. 'We still hope that our professional colleagues from agriculture will be more forthcoming in terms of their support to irrigation schemes' (Department of Irrigation, senior official, June 2016). At the local level, irrigation was closely linked to specific training and expertise. For example, when a new employee of the DOI was asked if he was the new irrigation officer, he corrected us, saying 'I am the new irrigation *engineer*'.

One ministerial official explained that: 'Politics always plays a big role in irrigation. It is not always about what works, but about what fulfils the goals of politicians' (Key informant interview, October 2014). A range of informants also spoke of competition for resources. An MP told us that: 'Ministries are in constant competition, especially Irrigation and Agriculture. They do not seem to like to work together, but rather compete on how much money or projects the other has' (Member of Parliament, October 2014). A district level official made a similar point: 'Ministries compete with each other. The Ministry of Agriculture is using the number of irrigation schemes constructed as a measure of its success. They never seem to care about the quality of these schemes. There are too many schemes and these are competing for the same resources' (District official, November 2014). The relationship between the government of Malawi and aid donors is also an important element of this, though beyond the scope of this paper. Some 40% of the national budget is funded by western foreign aid, which has been characterized by regular withdrawals and suspensions. Meanwhile, 'emerging' donors such as China are also playing an increasingly important role (Banik and Chasukwa 2016). As Anderson (2015) has suggested, such external financial inputs can result in considerable competition for donor funds among both government and civil society.

Conclusions

The SVTP and the various plans that preceded it illustrate a particular narrative: that irrigation is best managed in schemes that necessitate external expertise, financing and engineering. Through such schemes, farmer productivity can be improved (or modernized) and development achieved. Examples of this narrative exist across SSA and are illustrated in plans for new and rehabilitated schemes in Kenya, Tanzania, South Africa, Malawi and elsewhere. Approaches to organising schemes may change, for example in the increased concern with farmer participation, but the notion of the induced 'scheme' has not. As Li (2005: 386) puts it, 'certain kinds of solutions and problems become thinkable, whereas others are submerged'.

My account of the new SVTP does not amount to a comprehensive picture of a project deeply riven by strife or necessarily going against the will of the people. I am suggesting something slightly different; that this scheme, which will change the lives of many thousands, has a momentum within which dissent and contestation are, if not always minimised, then at the least not seen as insurmountable. Potential grievances can always be redressed through a clear mechanism, and the vision of the scheme is presented as a coherent one. To return to the questions around which this paper was framed, why is this? What shapes the dominant narratives and how do considerations of political economy and power come to influence them? Here, the 'irreversibility of commitment' is centrally important. As noted in the introduction, Veldwisch et al. (2009: 197) refer to the Bwanje Valley Irrigation Scheme, also in Malawi, as a case of 'informed amnesia'. I would suggest that the scheme I have discussed here does not illustrate 'informed amnesia' so much as an imperative to look forward rather than backward. This is a reflection of approaches to planned intervention that are still driven by predominantly technical solutions and the drivers of local, national and international politics.

Returning to the idea of 'lock-in', discussed earlier, there has been a tendency for the 'problem' to be constructed as something for which the scheme is the necessary solution. This gives the scheme a momentum that appears to be irreversible, but which is a reflection of the interaction between a complex range of factors. There are important political economy dimensions contributing to this lock-in; schemes involve the commitments of large sums of money - money that is spent on the significant costs of building infrastructure, but also on the complex planning processes that go into their development. The fact that funding has recently been agreed for the SVTP, bringing together a coalition of funders, indicates that in some sense the time is right. In the same way that the failure to fund the 1950s scheme reflects the politics of the time, the success of its 21st Century incarnation is also likely to be partly a matter of politics. Colonial aspirations for the Shire Valley Project were frustrated because of a lack of funds, though money was invested in the planning process. For the SVTP, there has been an accumulation of investment in the project over many years - not just in terms of money (though this has been substantial), but reflecting a political will to see something through to fruition. In this, changes of direction and modifications of rationale might be possible, but abandoning the whole idea is not.

In their discussion of the donor shaping of dominant narratives in Indonesia's irrigation development, Suhardiman and Mollinga (2012) suggest that an analysis of the lock-in which focuses on the intersecting interests of national and international elites does not capture the full dynamics of the situation. In their case, the dominant narratives of past decades are also important. This suggestion is also born out in the case of the SVTP, where history comes to shape the present in accounts that suggest the project has been 'a long time in the making', and thus desirable and inevitable. But such accounts overlook or ignore others that might lead to very different conclusions, including those that indicate possible inequitable results of the project.

Is this about the dominance of certain forms of expertise and the professionals that embody this expertise? As noted, earlier, there is an argument that an engineering imperative contributes to the gradually hegemonic nature of certain narratives (of under-utilisation of land, of the 'potential' for irrigation) that make schemes, once embarked upon, both necessary and irreversible (Bolding 2004, Diemer and Huibes 1996). The phenomenon is compounded by the authority, including authority over land that is provided by technological and engineering expertise. Beinart's (1985) account of the 'technical imagination' of Colonial officers in Nyasaland supports this position. For SSA more generally, Bonneuil (2000) suggests that from the 1930-1970s, development planning was partly driven by the government scientists who saw vast potential in the rivers and under-utilised land of swathes of SSA. Today, narratives of under-utilised land persist, both in the case of the SVTP and more widely. For example, the World Bank report on the 'Rising Global Interest in Farmland' (Deininger et.al 2011), which has been critiqued as a source of justifications for 'land grabs' (Bues and Thesfeld 2012, Richardson 2010, Woodhouse 2012). The authority for such claims increasingly lies in the data provided, for example, by GIS-based assessments, of the suitability of land for irrigation[12]. Such data, though important for mapping physical characteristics, are often disembedded from social and political context and based on assumptions about existing land usage that may involve a limited understanding of what people living there actually do with land (see Ferguson 2013, Li 2013).

There will also be broader political considerations of which contestation within government is one element, relationships with donors another, and engagement with the private sector a third. I have outlined some of the contestation within government above. When it comes to national politics, the specific competition between government departments plays a role and hints of this were evident in Malawi. This resonates with what Liebrand and Udas (2017: 134) found in Nepal, where irrigation

[12] An example is the FAO Aquastats database.

engineers protected their profession vis-a-vis agriculturalists and fighting for their 'mandate and reputation' was important. The relationship with the private sector is clearly also an important element of the picture. This has been the case over many years but is changing as ideological positioning about the importance of public private partnerships is tempered by the practical realities of what is possible and feasible. So, while the present incarnation of the SVIP was initially strongly conceptualized as being about the private sector taking centre-stage, this was modified because of a lack of project partners and the apparent lack of private sector capacity to process sugar. In the 1950s, the lack of private investment was a contributing factor to the abandonment of the plans.

Lastly, momentum is influenced by fragmentation: it is the result of the complexity of the component parts that go to make the scheme, which of necessity must then be simplified. The persistence of the model of schemes for irrigation development is thus not simply a matter of a failure to integrate social scientific with 'technical' understandings or the dominance of the latter over the former. Indeed, the SVTP was designed on the basis of, not only technical and engineering reports, but also detailed studies by social scientists. Such background studies are essential elements of new scheme design. They collect detailed information, only some of which may be used in the project planning, and which does not alter the fundamental model of the scheme itself. As a District official expressed it: 'Once consultancy reports are gone through and approved, it is very difficult to enter any new and different views of the field situation. The focus is always on the scheme. That is what project funds are for' (District official, November 2014).

I noted at the beginning of this paper that farmer led irrigation has been increasingly recognised as a significant activity in SSA. As Woodhouse et.al (2016) have pointed out, this observation provides an alternative perspective to narratives that favour large scale public and private investments in irrigation. Such narratives characterise farmers' initiatives as stagnant, unproductive and

unmodernised, and thus overlook what farmers actually do and underestimate the extent of irrigation practised. However, analysis here has shown that the model of the irrigation scheme persists because it has an enduring appeal and logic for its promoters. This is embedded in a political economy in which moving large sums of money, creating the visible and the visitable, and intervening in social relations such as land tenure is seen as both necessary and desirable. To counteract this narrative, further research which questions its assumptions and explores the historical background through which schemes have become the default approach to irrigation in SSA is warranted.

References

Adams, W. and Anderson, D. 1988. 'Irrigation before development: indigenous and induced change in agricultural water management in East Africa', *African Affairs* 87-349: 519−535.

Allan JA. 2006. IWRM: the new sanctioned discourse? In IWRM in South Asia: Global Theory, Emerging Practice and Local Needs, Water in South Asia Series 1, Mollinga PP, Dixit A, Athukorala K (eds). Sage: New Delhi; 38–63.

African Development Bank, African Water Facility. 2013. Shire Valley Irrigation Project Phase I. Project Preparation Activities.

Amer, J. and Hutcheson. A. 1965. 'The Nchalo sugar estate: a major agricultural development in Malawi' *The Society of Malawi Journal* 20, no.1: 7-3.

Anderson, N.J. 2016. Ephemeral development agendas and the process of priority shifts in Malawi, *Journal of Asian and African Studies*,. doi: 10.1177/0021909616630567.

Bähre, E., & Lecocq, B. 2007. The drama of development: The skirmishes behind high modernist schemes in Africa. *African Studies, 66*, no.1: 1-8.

Banik, D. and Chinsinga, B (eds.) 2016. *Political transition and inclusive development in Malawi: The democratic dividend*. United Kingdom: Routledge.

Bebbington, A, Guggenheim, S, Olson, E and Woodcock, M. 2004. 'Exploring social capital debates at the World Bank. *Journal of Development Studies*, vol. 40, no.5: 33-42

Beinart, W.1985. Agricultural Planning and the Late Colonial Technical Imagination: the Lower Shire Valley in Malawi, 1940-1960 in J.McCracken (ed.), Malawi: an Alternative Pattern of Development (Centre for African Studies, University of Edinburgh, 1985), 93-148

Blomkvist, P. and Nilsson, D. 2017. On the need for system alignment in large water infrastructure: understanding infrastructure dynamics in Nairobi, Kenya. *Water Alternatives* 10(2): 283-302.

Bolding A. 2004. In hot water. A study on sociotechnical intervention models and practices of water use in smallholder agriculture, Nyanyadzi catchment, Zimbabwe.

Bonneuil, C. 2000. Development as experiment: Science and state building in late colonial and Postcolonial Africa, 1930-1970, *Osiris*, 15: 258–281. doi: 10.1086/649330.

BRL Ingénierie. 2011. Public private partnership options study and awareness raising for irrigation investment in Malawi.

Chambers, R. 1969. *Settlement schemes in tropical Africa: a study of organisations and development.* New York: Praeger.

Chambers, R. and Moris, J. 1973. *Mwea : an irrigated rice settlement in Kenya*. Weltforum Verlag.

Chidanti-Malunga, J. 2009. When Government Acts Against the Will of the People: The Case of Bwanje Valley Irrigation Scheme in Malawi. *Journal of Applied Sciences Research*, 5(3): 323-328,

Chinsinga, B. 2016. 'The Green Belt Initiative, Politics and Sugar Production in Malawi', *Journal of Southern African Studies*, DOI: 10.1080/03057070.2016.1211401

Chiroro, C. 2015. Innovations to promote growth in small scale irrigation in Africa. Malawi Report. Unpublished project report, University of Sussex. https://www.sussex.ac.uk/webteam/gateway/file.php?name=malawi-report-nov-2015.pdf&site=11

Cleaver, F. 2012. *Development through bricolage. Rethinking institutions for natural resource management.* London: Routledge.

Cornwall, A. and Eade, D. 2010. *Buzzwords and Fuzzwords: Deconstructing Development Discourse.* London: Practical Action Publishing.

Coward, E. 1986. 'Direct or indirect alternatives for irrigation investment and the creation of property, in Easter, KW (ed). *Irrigation investment, technology and management strategies for development*: Boulder, Colorado: Westview Press: 225-244.

Cowen, M. and Shenton, R. 1991. The origin and course of Fabian colonialism in Africa, *Journal of Historical Sociology*, 4, no.2: 143–174. doi: 10.1111/j.1467-6443.1991.tb00101.x.

Crewe, E and Harrison, E (1998) *Whose Development? An Ethnography of Aid.* London: Zed

Crow-Miller, B.; Webber, M. and Molle, F. 2017. The (re)turn to infrastructure for water management? *Water Alternatives* 10(2): 195-207.

Deininger, K., Byerlee, D. and Lindsay, J. 2011. *Rising global interest in farmland: Can it yield sustainable and equitable benefits?* Washington, D.C.: World Bank Publications.

Dey, J. 1981. Gambian women: Unequal partners in rice development projects?', *The Journal of Development Studies* 17, no. 3: 109–122. doi: 10.1080/00220388108421801.

Dey, J.1982. Development planning in The Gambia: The gap between planners" and farmers" perceptions, expectations and objectives, *World Development,* 10, no.5: 377–396. doi: 10.1016/0305-750x(82)90084-5.

Diemer G and Huibes, F. (eds) 1996. *Crops, people and irrigation: water allocation practices of farmers and engineers*. IT Publications.

Ertsen, M. 2006. Colonial Irrigation: Myths of Emptiness, *Landscape Research*, 31:2, 147-167.

Escobar, A. 1995. *Encountering development: The making and unmaking of the third world.* Princeton, NJ. Princeton University Press.

Fairhead, J and Leach, M. 1997. 'Webs of power and the construction of environmental policy problems: forest loss in Guinea', in (ed) Grillo, R and Stirrat, R. *Discourses of Development: Anthropological Perspectives;* Oxford; Berg: 35-58.

Ferguson, A. and Mulwafu, W. 2007. If Government Failed, how are we to Succeed? The Importance of History and Context in Present-day Irrigation Reform in Malawi. In

Community-based Water Law and Water Resource Management Reform in Developing Countries (eds B.van Koppen, M. Giordano and J .Butterworth); CABI Publications.

Ferguson, J. 2013. How to do things with land: A distributive perspective on rural livelihoods in Southern Africa. *Journal of Agrarian Change*, *13*, no.1:166-174.

Garces-Restrepo, C., D.Vermillion and G.Muňoz. 2007. *Irrigation management transfer: Worldwide efforts and results*. FAO Water Reports No. 32. Rome: FAO

Government of Malawi, Ministry of Agriculture, Irrigation and Water Development 2017a**.** Shire Valley Irrigation Project.Communication, Community Participation, Land Tenure and Resettlement Policy Framework.

Government of Malawi, Ministry of Agriculture, Irrigation and Water Development. 2017b. Shire Valley Irrigation Project. Environmental and Social Management Plan for Phase 1.

Griffin, A.E. 1946. A Report on Flood Control and Reclamation on the Lower Shire River and other Specified Areas in Nyasaland, published HM Crown Agents for Colonies, Millbank: London.

Gwiyani-Nkhoma, B. 2011. Irrigation development and its socioeconomic impact on rural communities in Malawi. *Development Southern Africa*, 28/2

Hanger, J. and Moris, J. 1973. 'Women and the household economy' in (eds) Chambers, R and Moris, J. *Mwea: an irrigated rice settlement in Kenya.* Munchen: Weltforum Verlag.

Harrison, E. and Chiroro, C. 2016. 'Differentiated legitimacy, differentiated resilience: Beyond the natural in "natural disasters"', *The Journal of Peasant Studies*, 1–21. doi: 10.1080/03066150.2016.1193011.

Hermann, R. and Grote, U. 2015. Large-scale Agro-Industrial Investments and Rural Poverty: Evidence from Sugarcane in Malawi. *Journal of African Economies*, 24, no.5: 645–676.

Halcrow, W & Partners. 1954 'The Shire Valley Project; a report on the control and development of Lake Nyasa and the Shire River'. London.

Humphrey, C. 2005 'Ideology in infrastructure: architecture and Soviet imagination,' *Journal of the Royal Anthropological Institute*. Vol 11 no 1, March.. 39-58

Kamau, J. 2016. The Sh50bn white elephant in Bura, Tana River, Kenya Nation, Nov 19 2016. http://www.nation.co.ke/counties/tana-river/the-white-elephant-in-bura/3444928-3458308-format-xhtml-7lx8j5z/index.html

Kanthack, F. E. 1941. 'The Fluctuations of Lake Nyasa', *The Geographical Journal*, 98 (1) 20-33.

Koetsier, D. 2014. Seeing like an engineer in a dynamic context. A case study about negotiations during the implementation of the Narayani Lift Irrigation Scheme, Nepal. MSc Thesis, Water Resources Management Group, Wageningen University.

Lankford, BA, Makin, I., Matthews, N., Noble, A., McCornick, P. and Shah, T. 2016. A compact to revitalise large-scale irrigation systems using a leadership-partnership-ownership 'theory of change'. *Water Alternatives* 9, no.1: 1-32.

Lecoutere, E. 2011. Institutions under construction: resolving resource conflicts in Tanzanian irrigation schemes. *Journal of Eastern African Studies*, *5*, no.2: 252-273.

Leach, M., Scoones, I., and Stirling, A. 2010. *Dynamic Sustainabilities: Technology, Environment and Social Justice.*

Li ,T.M. 2005. Beyond "the state" and failed schemes, *American Anthropologist*, 107, no.3: 383–394.

Li, T.M. 2011. 'Centering labor in the land grab debate', *Journal of Peasant Studies*, 38, no.2: 281–298. doi: 10.1080/03066150.2011.559009.

Liebrand, J. 2010. 'Masculinities: a scale challenge in irrigation governance in Nepal. Paper presented at the 5 seminar of the FMIS Promotion Trust. Dynamics of Farmer Managed Irrigation Systems: Socio-institutional, economic and technical context. March 25-26, 2010. Kathmandu. Nepal.

Liebrand, J. and Udas P. 2017. 'Becoming an engineer or a lady engineer: exploring professional performance and masculinity in Nepal's Department of Irrigation. *Engineering Studies*, 9 (2): 120-139.

Mdee, A., Harrison, E., Mdee, C., Mdee, E. and Bahati, E. 2014 The politics of small-scale irrigation in Tanzania: making sense of failed expectations. *Future Agricultures Working Paper*, (107).

Merrey D, Meinzen-Dick R, Mollinga, P and Karar E. 2007. 'Policy and institutional reform: the art of the possible',in D Molden (ed) *Water for food, water for life: a comprehensive assessment of water management in agriculture*. London: Earthscan, pp.193-231.

Mitchell, T. 2002. *Rule of experts: Egypt, techno-politics, modernity*. Berkeley, CA: University of California Press.

Molle, F., and Floch, P. 2008, Mega Project and social and environmental Changes: the case of the Thai "Water Grid"? *Ambio,* 37 (3), 199-204.

Molle, F., Mollinga, P. P., & Wester, P. 2009a. Hydraulic bureaucracies and the hydraulic mission: flows of water, flows of power. *Water Alternatives*, *2*(3), 328-349.

Molle, F., Floch, P., Promphakping, B., & Blake, D. J. 2009b. 'The 'Greening of Isaan': politics, ideology and irrigation development in the northeast of Thailand'.In Molle, Francois; Foran, T.; Kakonen, M. (Eds.). *Contested waterscapes in the Mekong region: hydropower, livelihoods and governance.* London, UK: Earthscan, 253-282.

Mollinga, P. P. 2003. *On the waterfront: water distribution, technology and agrarian change in a South Indian canal irrigation system*. Orient Blackswan.

Mollinga, P. P. 2009, Towards the transdisciplinary engineer: Incorporating ecology, equity and democracy concerns into water professionals' attitudes, skills and knowledge. *Irrigation and Drainage*, 58: S195–S204. doi:10.1002/ird.510

Mollinga, P and Bolding, A eds. 2004. *The politics of irrigation reform. Contested policy formulation and implementation in Asia, Africa and Latin America.* Aldershot: Ashgate Publishing Ltd. (Global Environmental Governance series).

Moris, J. and Thom, D. 1990. *Irrigation Development in Africa: lessons of experience*. Studies in water policy and management, no.14. Boulder, Colorado: Westview Press.

Mosse, D. 2005. *Cultivating development: An ethnography of aid policy and practice*. London, Pluto Press.

Mosse, D. 2011. *Adventures in Aidland: The Anthropology of Professionals in International Development.* London: Berghahn

Muchara, B., G.Ortmann, E.Wale, M.Mudhara (2014) 'Collective action and participation in irrigation water management: a case study of Mooi River Irrigation Scheme in KwaZulu-Natal Province, South Africa' *Water SA*, 40 (4), p.699−708.

Mundial, B. 1988. Rural Development: World Bank Experience, 1965-1986.Operation Evaluation Department. Washington, DC.

Mwendera, E. and Chilonda, P. 2013. Conceptual Framework For Revitalisation Of Small-Scale Irrigation Schemes In Southern Africa, *Irrigation and Drainage*, 62, no.2: 208–220. doi: 10.1002/ird.1723.

Oates, N., Jobbins, G,. Mosello, B., and Arnold, J. 2015. *Pathways for irrigation development in Africa – insights from Ethiopia, Morocco and Mozambique.* Future Agricultures Working Paper, no. 119.

Ostrom, E. 1992. *Crafting Institutions for Self-governing Irrigation System*, California, Institute for Contemporary Studies.

Pacey, A. and Thrupp, L. 1989. *Farmer first: farmer innovation and agricultural research*. London: Intermediate Technology Publications.

Patel, R. 2013. "The Long Green Revolution." *The Journal of Peasant Studies* 40/1: 1-63.

Peters, P 2010. “Our daughters inherit our land, but our sons use their wives' fields”: matrilineal-matrilocal land tenure and the New Land Policy in Malawi, *Journal of Eastern African Studies*, 4:1, 179-199.

Reuss, M. (2008). Seeing Like an Engineer: Water Projects and the Mediation of the Incommensurable. *Technology and Culture*, *49*(3), 531-546.

Roe, E. 1994. *Narrative policy analysis: theory and practice*. Durham, NC: Duke University Press.

Scott, J.C. 1998. *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven, CT: Yale University Press.

Sillitoe, P. 2006. Indigenous knowledge in development, *Anthropology in Action*, 13, no.3: 1–12. doi: 10.3167/aia.2006.130302.

Stirling, A. 2015.Towards innovation democracy? Participation, responsibility and precaution in the politics of science and technology, STEPS Working Paper 78, Brighton: STEPS Centre.

Suhardiman, D. and Giordano, M. 2014. Is there an alternative for irrigation reform? *World Development*, 57: 91–100. doi: 10.1016/j.worlddev.2013.11.016.

Suhardiman, D., and Mollinga, P. 2012. Correlations, causes and the logic of obscuration: donor shaping of dominant narratives in Indonesia's irrigation development', *The Journal of Development Studies* 48/7: 923-938.

Trier R. 2014. Review of international experience with public-private partnership in the irrigation subsector, *Irrigation and Drainage*, 63, No.2:212–220. doi: 10.1002/ird.1837.

United Kingdom Colonial Office. 1951. *Notes on some agricultural development schemes in Africa*. London: HMSO.

Unruh, G. 2010. Understanding carbon lock-in', *Energy Policy* 28: 817- 830

Van Koppen, B. and Hussain, I. 2007, Gender and irrigation: overview of issues and options. Irrig. and Drain., 56: 289–298. doi:10.1002/ird.296

van Koppen, B., V.Cossio Rojas and T.Skielboe. 2012. 'Project politics, priorities and participation in rural water schemes'. *Water Alternatives* 5(1): 1−15.

Veldwisch, G., Bolding, A. and Wester, P. 2009. Sand in the engine: The travails of an Irrigated rice scheme in Bwanje valley, Malawi', *Journal of Development Studies*, 45, no.2: 197–226. doi: 10.1080/00220380802265587.

Venkatesan, S. and Yarrow, T. (eds.) 2012. *Differentiating development: Beyond an anthropology of critique*. New York: Berghahn Books.

Venot, JP. 2014. 'Rethinking commons management in Sub-Saharan West Africa: public authority and participation in the agricultural water sector', *Water International*, 39:4: 534−548, DOI: 10.1080/02508060.2014.911647.

Wade R and Chambers R.1980. 'Managing the main system: canal irrigation's blind spot' *Economic and Political Weekly*, A107-A112.

Webb, P. 1991. When projects collapse: Irrigation failure in the Gambia from a household perspective', *Journal of International Development*, 3, no.3: 339–353. doi: 10.1002/jid.4010030310.

Welsh, M. 2013. Repositioning the Shire Valley Project: a retrospective (part 1). *The Society of Malawi Journal*, *66*, no.2: 51–60.

Welsh, M. 2014. Repositioning the Shire Valley Project – a retrospective (Part II) *The Society of Malawi Journal*, 67, no.1: 46-56.

Woodhouse, P. 2012. New investment, old challenges. Land deals and the water constraint in African agriculture. *Journal of Peasant Studies*, *39*, no.s 3-4: 777–794. doi:10.1080/03066150.2012.660481.

Woodhouse, P., G.Veldwisch, J.Venot, D.Brockington, H.Komakech & A.Manjichi. 2016. 'African farmer-led irrigation development: re-framing agricultural policy and investment?' *The Journal of Peasant Studies*, DOI: 10.1080/03066150.2016.1219719.

World Bank. 2013. Shire Valley Irrigation Project. Project Information Document. Available at http://projects.worldbank.org/P125473/?lang=en&tab=documents&subTab=projectDocuments Last accessed 18 November 2016

World Bank 2017a. *Malawi - Shire Valley Transformation Program*. Washington, D.C. : http://documents.worldbank.org/curated/en/379081508551260039/Malawi-Shire-Valley-Transformation-Program

World Bank, 2017b Press release: An agenda to transform Malawi's agriculture. http://www.worldbank.org/en/news/press-release/2017/10/18/an-agenda-to-transform-malawis-irrigated-agriculture

You, L. C.Ringler, U.Wood-Sichra, R.Robertson, S.Wood, T.Zhu, G.Nelson, Z.Guo, Y.Sun. 2011. What is the irrigation potential for Africa? A combined biophysical and socioeconomic approach. *Food Policy*, 36(6), p.770-782.

Decade	Key developments	Sources
1920s	Sharpe, former governor of Nyasaland, suggests using waters of the Shire for Irrigation	Sharpe (1921)
1930s	Increasing concern with 'unruly flows' of Lake Nyasa	Welsh (2013, 2014)
1940s	Empire Cotton Growers Corporation-sponsored study recommends irrigation to control flow of water through the Shire Valley. Kanthack report suggests lake level can be stabilised with dam in upper Shire Valley, also with HEP. Reports by Griffin, Debenham on feasibility of agricultural development including irrigation 1948 - Halcrow study initiated. Completed 1954.	Beinart (1985), Welsh (2013) Kanthack (1941) Griffin (1949)
1950s	Shire Valley Project proposed, including increasing the area of cultivable land by 100,000 acres through irrigation. Total cost of proposed project: £78 million. Sugar plantation plans initiated with Booker-McConnell (later withdrew because of lack of incentives). Temporary bund across Shire River constructed 1956, breached in 1957, contributing to abandonment of plans for project.	Halcrow and Partners (1954) Beinart (1985)
1960s	Large scale sugar plantation established at Nchalo,	Amer and Hutcheson (1965)
1970s	Plans for Kasinthula irrigation project, including diverting water by canals from Kapichira Falls. Canals not built.	Welsh (2013)

1980s	Series of schemes for development in the Shire Valley, including irrigation. Evaluation says these had limited success 1989. Land tenure study for large scale irrigation project commissioned by GoM.	Mundial (1988) World Bank (2013)
1990s	1992. Feasibility study completed 1997 Feasibility study updated	CODA and Partners
2000s	2000 Kapichira Dam completed (HEP generation) 2008 Further update of 1992/1997 studies	CODA and Partners (2008)
2010s	2010 World Bank mission; 2011 Joint WB/AFB mission; 2012, ADB mission; leading to 2013 SVIP project appraisal. 2011 Study of public-private partnership options for SVIP. 2013. Project information document published 2015-7 series of background studies carried out in preparation for SVIP. These are not in the public domain, so not referenced here. Brought together into policy documents covering environmental, social, and resettlement aspects of the proposal, among others. 2017. Final project document agreement signed.	ADB/AWF (2013) BRL Ingenierie (2011) World Bank (2013) GOM (2017a, 2017b) World Bank (2017b)

Table 1: The Evolution of the SVIP/SVTP